Portland Harbor BERA risks for selected sample types by river mile

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Attached is a draft table presenting the identified risks in the BERA for the following sample types:

Sediment (PEL, PEC and petroleum hydrocarbon risks)
Surface water
Transition zone water
Bivalve tissue
Smallmouth bass tissue
Sculpin tissue

With the exception of TZW, the above sample types are the only ones within the BERA with at least one sample within each river mile between RM 1.9 - 11.8. TZW samples have among the highest hazard quotients in the BERA, and also serve to identify some contaminant sources to the harbor.

This table illustrates which chemicals pose risks in various sections of the harbor, as well as the change in magnitude of risks for any given contaminant as one travels from one end of the harbor to the other. Neither the draft final BERA or the RI report has a table that summarizes risks in this manner. Generation of this table required recalculating essentially all of the hazard quotients in the BERA, so that the full range of risks for each contaminant could be shown. This level of recalculation addresses several of our comments on the draft final BERA, where it appeared mistakes were made and several chemicals should have posed risks according to the BERA, but which didn't show up in the LWG summary tables. Turns out that in a couple of instances, 'U' qualified data on samples with poor detection limits higher than TRV's had hazard quotients calculated (e.g. endrin). Also identified a chemical in TZW (acrolein) that should have been found to have an HQ greater than one, but wasn't.

The sediment risk calculations part of the attached include risks for petroleum hydrocarbon fractions, a calculation we directed LWG to do in the BERA, but which they didn't. The addition of TPH risks will increase the count of contaminants of concern in the BERA by 3. Sediment risks for River Mile 8 - 9 are not summarized yet, because the BERA dataset does not contain an identifier of which samples in this river reach are from Swan Island Lagoon and which are from the main channel of the Willamette River. That information will need to be pulled out of either GIS mapping files or Query Manager files before the table can be completed.

Crayfish tissue risks are also not shown. There is at least one crayfish composite for each river mile, however, copper is the only contaminant posing risk in crayfish tissue. It turns out to be the only species where a chemical poses a risk in every tissue sample for that species, with risks between hazard quotients of 1.4 and 2.6 for copper. A little digging turned up the fact that the crayfish species in the Study Area, Pacifastacus leniusculus, has a copper-based respiratory pigment, hemocyanin, instead of the iron-based hemoglobin most species have. Its not unusual for invertebrates to have a copper based respiratory pigment, and the elevated copper levels in the crayfish are most likely due to its physiological need for higher copper than most species. Will give the LWG a technically legitimate reason to question site risks to crayfish, something they can add to the uncertainty section of BERA Section 6.

I'd appreciate any suggestions on table format or presentation that would inprove the table.

Best regards,

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"Facts are stubborn things"
        - John Adams

BERA Table 11-3 from EPA risks by river mile.xlsx